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EXAMINER	
DOBSON, DANIEL G	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,770	HASHIMOTO ET AL.	
	Examiner	Art Unit	
	DANIEL G. DOBSON	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/14/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5-10, 12, 13, and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication 2001/0030791 A1 to Taneda and U.S. Patent Application Publication 2002/0170900 A1 to Ono et al.

As to **Claim 1**, *Taneda* discloses a method for controlling bias of optical modulator (Fig. 5) for controlling a DC bias of each of a plurality of optical modulating sections (Fig. 5, section (2a) and section (2b)) of an optical modulator, comprising the steps of:

superposing a low frequency electrical signal with a specific frequency on a modulating signal or a DC bias applied into each of the plurality of optical modulating sections (Fig. 5, bias control circuits (61 and 62, one for each modulation section) apply a low frequency electrical signal (6 and 10kHz respectively, ¶ 35) which are superimposed on the modulating signal at (Fig. 5, 7 and 8));

detecting a change of light intensity corresponding to the low frequency electrical signal from the optical wave after being combined (Fig. 5, the change in light intensity is detected at photodiode (5)); and

controlling the DC bias of each optical modulating section based on the detected change of light intensity (Fig. 5, the signal from the photodiode (5) is fed back to the bias control circuits (61 and 62.))

Taneda does not expressly disclose that the optical modulator comprises an optical waveguide formed on a substrate with an electro-optic effect and the plurality of optical modulating sections for modulating optical waves propagating through the optical waveguide the optical modulator being configured so as to combine the optical waves modulated by the plurality of optical modulating sections.

Ono discloses an optical modulator comprising an optical waveguide (Fig. 12, path from laser to output of modulator) formed on a substrate with an electro-optic effect (Fig. 12, 70, lithium niobate substrate) and the plurality of optical modulating sections (Fig. 12, 72 and 73) for modulating optical waves propagating through the optical waveguide, the modulator being configured so as to combine the optical wave modulated by the plurality of optical modulating sections (Fig. 12, the signal from the two sections (72 and 73) are combined at the output of the modulator.)

Taneda and *Ono* are from the same art with respect to optical communications, and are therefore analogous art.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to use an optical modulator formed on a substrate with an electro-optic effect (*Ono*) in the system disclosed by *Taneda*. The

suggestion/motivation would have been to create a narrow SSB signal with a simplified modulator (¶ 73.)

As to **Claim 2**, *Taneda* discloses wherein the specific frequency differs between each optical modulating section (¶ 35, 6 kHz and 10 kHz.)

As to **Claim 3**, *Taneda* discloses wherein the specific frequencies are not made to be an integral multiplication of each other (¶ 35, 6 kHz and 10 kHz.)

As to **Claim 5**, *Taneda* discloses a method for controlling bias of optical modulator (Fig. 5) for controlling a DC bias of each of a plurality of optical modulating sections (Fig. 5, section (2a) and section (2b)) of an optical modulator, comprising the steps of:

superposing a low frequency electrical signal with a specific frequency on a modulating signal or a DC bias applied into at least one of the plurality of optical modulating sections (Fig. 5, bias control circuits (61 and 62, one for each modulation section) apply a low frequency electrical signal (6 and 10kHz respectively, ¶ 35) which are superimposed on the modulating signal at (Fig. 5, 7 and 8));

detecting a change of light intensity corresponding to the low frequency electrical signal from the optical wave exiting from the optical modulating section, into which the modulating signal or the DC bias superposed with the low frequency electrical signal is applied (Fig. 5, the change in light intensity is detected at photodiode (5)); and

controlling the DC biases of all or some of the plurality of optical modulating sections based on the detected change of light intensity (Fig. 5, the signal from the photodiode (5) is fed back to the bias control circuits (61 and 62.))

Taneda does not expressly disclose that the optical modulator comprises an optical waveguide formed on a substrate with an electro-optic effect and the plurality of optical modulating sections for modulating optical waves propagating through the optical waveguide the optical modulator being configured so as to combine the optical waves modulated by the plurality of optical modulating sections.

Ono discloses an optical modulator comprising an optical waveguide (Fig. 12, path from laser to output of modulator) formed on a substrate with an electro-optic effect (Fig. 12, 70, lithium niobate substrate) and the plurality of optical modulating sections (Fig. 12, 72 and 73) for modulating optical waves propagating through the optical waveguide, the modulator being configured so as to combine the optical wave modulated by the plurality of optical modulating sections (Fig. 12, the signal from the two sections (72 and 73) are combined at the output of the modulator.)

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to use an optical modulator formed on a substrate with an electro-optic effect (*Ono*) in the system disclosed by *Taneda*. The suggestion/motivation would have been to create a narrow SSB signal with a simplified modulator (¶ 73.)

As to **Claim 6**, *Taneda* discloses wherein the control of the DC biases of all or some of the plurality of optical modulating sections is performed by determining a controlled variable (Fig. 5, 14a and 14b, the amount of bias applied is a controlled variable and is based on the change in light intensity detected at the photodiode (5.))

As to **Claim 7**, *Taneda* discloses a device for controlling bias of optical modulator (Fig. 5) for controlling a DC bias of each of a plurality of optical modulating sections (Fig. 5, section (2a) and section (2b)) of an optical modulator comprising

a DC bias application means for applying a DC bias into each of the plurality of optical modulating sections (Fig. 5, bias control circuits (61 and 62) and voltage application circuits (9a and 9b));

a low frequency electrical signal superposing circuit for superposing a low frequency electrical signal with a specific frequency on a modulating signal or a DC bias applied into each of the plurality of optical modulating sections (Fig. 5, a low frequency signal is supplied by the bias control circuits (61 and 62) via lines (15a and 15b) to the modulating signals at drivers (7 and 8));

an optical detecting means for detecting a change of light intensity of the optical wave passing through the combining element (Fig. 5, 5, photodetector); and

a bias controlling means for extracting the change of light intensity corresponding to the low frequency electrical signal from the optical detecting

means and for controlling the DC bias application means based on the extracted change of light intensity (Fig. 5, bias control circuits (61 and 62) shown in more detail in Fig. 6; light intensity signal from photodetector (5) is used by control circuit (68) to control the bias applied (14a and 14b.)

Taneda does not expressly disclose a substrate with an electro-optic effect, an optical waveguide formed on the substrate, the plurality of optical modulating sections for modulating optical waves propagating through the optical waveguide, and a combining element provided for the optical waveguide for combining the optical waves modulated by the plurality of optical modulating sections.

Ono discloses a substrate with an electro-optic effect (Fig. 12, 70, lithium niobate), an optical waveguide formed on the substrate (Fig. 12, waveguide from laser to output), the plurality of optical modulating sections for modulating optical waves propagating through the optical waveguide (Fig. 12, sections 71 and 72), and a combining element provided (Fig. 12, 1 X 2 coupler on output of the modulator) for the optical waveguide for combining the optical waves modulated by the plurality of optical modulating sections.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to use an optical modulator formed on a substrate with an electro-optic effect (*Ono*) in the system disclosed by *Taneda*. The suggestion/motivation would have been to create a narrow SSB signal with a simplified modulator (¶ 73.)

As to **Claim 8**, *Taneda* discloses wherein the low frequency electrical signal superposing circuit comprises a plurality of low frequency electrical signal generation elements for generating the low frequency electrical signal respectively corresponding to the plurality of optical modulating sections (Fig. 6, 63, oscillator for each frequency.)

As to **Claim 9**, *Taneda* discloses wherein the low frequency electrical signal superposing circuit comprises one low frequency electrical signal generation element for generating the low frequency electrical signal (Fig. 6, 63), and switches the low frequency electrical signal generated from the low frequency electrical signal generation element to supply the low frequency electrical signal (Fig. 6, divider (64.))

Taneda does not expressly disclose that a single oscillator is used to provide the low frequency signal to each optical modulating section. However, *Taneda* does disclose an oscillator and a divider to derive the desired dither frequency for application to the modulation sections. Official notice is taken that it is common in the art to use a single oscillator and a plurality of multipliers/dividers to derive signals of desired frequency.

At the time of the invention it would have been obvious for a person of ordinary skill in the art to use a single frequency source and multipliers/dividers to generate the two dither signals disclosed by *Taneda*. The suggestion/motivation would have been to reduce the board space required for the controller.

As to **Claim 10**, *Taneda* discloses a device for controlling bias of optical modulator (Fig. 5) for controlling a DC bias of each of a plurality of optical modulating sections (Fig. 5, section (2a) and section (2b)) of an optical modulator comprising

a DC bias application means for applying a DC bias into each of the plurality of optical modulating sections (Fig. 5, bias control circuits (61 and 62) and voltage application circuits (9a and 9b));

a low frequency electrical signal superposing circuit for superposing a low frequency electrical signal with a specific frequency on a modulating signal or a DC bias applied into each of the plurality of optical modulating sections (Fig. 5, a low frequency signal is supplied by the bias control circuits (61 and 62) via lines (15a and 15b) to the modulating signals at drivers (7 and 8));

an optical detecting means for detecting a change of light intensity of the optical wave passing through the combining element (Fig. 5, 5, photodetector); and

a bias controlling means for extracting the change of light intensity corresponding to the low frequency electrical signal from the optical detecting means and for controlling the DC bias application means of all of the plurality of optical modulating sections based on the extracted change of light intensity (Fig. 5, bias control circuits (61 and 62) shown in more detail in Fig. 6; light intensity signal from photodetector (5) is used by control circuit (68) to control the bias applied (14a and 14b.)

Taneda does not expressly disclose a substrate with an electro-optic effect, an optical waveguide formed on the substrate, the plurality of optical modulating sections for modulating optical waves propagating through the optical waveguide, and a combining element provided for the optical waveguide for combining the optical waves modulated by the plurality of optical modulating sections.

Ono discloses a substrate with an electro-optic effect (Fig. 12, 70, lithium niobate), an optical waveguide formed on the substrate (Fig. 12, waveguide from laser to output), the plurality of optical modulating sections for modulating optical waves propagating through the optical waveguide (Fig. 12, sections 71 and 72), and a combining element provided (Fig. 12, 1 X 2 coupler on output of the modulator) for the optical waveguide for combining the optical waves modulated by the plurality of optical modulating sections.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to use an optical modulator formed on a substrate with an electro-optic effect (*Ono*) in the system disclosed by *Taneda*. The suggestion/motivation would have been to create a narrow SSB signal with a simplified modulator (¶ 73.)

As to **Claims 12, 18, and 20** *Taneda* discloses wherein the optical detecting means detects an optical wave guided out by a directional coupler positioned adjacent to the optical waveguide (Fig. 5, 3.)

As to **Claims 13, 19, 21, 22, and 23** *Taneda* discloses wherein the optical detecting means detects an optical wave, which exits the optical modulator (Fig. 5, exits at 16) and is thereafter branched by an optical branching means (Fig. 5, 3.)

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication 2001/0030791 A1 to Taneda and U.S. Patent Application Publication 2002/0170900 A1 to Ono et al., as applied above, and further in view of U.S. Patent 6,118,564 to Ooi et al.

As to **Claim 4**, *Ooi* discloses wherein the low frequency signal is superposed at different times on each optical modulating section (Fig. 15, low frequency signal from (63) is switched to each of the modulators in time.)

Ooi is from the same art with respect to optical communications, and is therefore analogous art.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to superpose the low frequency signal at different times to each of the modulating sections (*Ooi*) on the modulator disclosed by *Taneda* and *Ono*. The suggestion/motivation would have been to reduce the number of components needed. By time division multiplexing the feedback signal only one copy of the feed back circuit is needed to service multiple modulating sections.

4. Claims 11, 14-17, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication 2001/0030791 A1 to Taneda and

U.S. Patent Application Publication 2002/0170900 A1 to Ono et al., as applied above, and further in view of U.S. Patent 7,340,114 B2 to Doi et al.

As to **Claim 11, 15, 16, 17** *Doi* discloses wherein the optical detecting means detects an optical wave emitted from the optical waveguide into the substrate (Fig's. 13, 14A, and 14B.)

Doi is from the same art with respect to optical communications, and is therefore analogous art.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to detect an optical wave that has passed into the substrate (*Doi*) in the system disclosed by *Taneda* and *Ono*. The suggestion/motivation would have been to measure power from light that will be lost anyway rather than tap off further light from the waveguide, thereby decreasing optical budget.

As to **Claim 14, 24, and 25** *Doi* discloses wherein the optical detecting means comprises at least two optical detectors (Fig. 14B.) The suggestion/motivation is the same as that used in the rejection for claim 11.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL G. DOBSON whose telephone number is (571)272-9781. The examiner can normally be reached on Mon. - Fri. 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel G. Dobson/
Examiner, Art Unit 2613
12/17/2008

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613